Table 1. The validated state transiti ns from a State Si(k) t State Sj(k+1)

	$S_h(k+1)$	$S_c(k+1)$	$S_s(k+1)$	$S_u(k+1)$	$S_p(k+1)$	$S_d(k+1)$	$S_e(k+1)$
$S_h(k)$	$R_{h,h}$	$R_{h,c}$	0	0	0	0	0
$S_c(k)$	$R_{c,h}$	$R_{c,c}$	$R_{c,s}$	0	0	0	0
$S_s(k)$	0	$R_{s,c}$	0	$R_{s,u}$	0	0	0
$S_u(k)$	0	0	$R_{u,s}$	$R_{u,u}$	$R_{u,p}$	0	0
$S_p(k)$	0	0	0	0	0	$R_{p,d}$	0
$S_d(k)$	0	0	0	$R_{d,u}$	0	$R_{d,d}$	$R_{d,e}$
$S_e(k)$	$R_{e,h}$	0	0	0	0	0	0

Equation (1), (2) and (3):

If,
- *l* denotes the year
- L is the current year
- *m* is the number of years with historical data available
- *i* denotes the day of the month
- *j* is the month of a year. (an exemplary time unit used for simplified demonstration purposes only)

Thus, *i∈[1,31], j∈[1,12], l and m are integers.*

$$\bar{x}_j = \frac{1}{m \times n} \sum_{l=L-1}^{L-m} \sum_{i=1}^{n} x_{l,j,i} \qquad (where\ i \in [1,31]\ and\ j \in [1,12]) \qquad (1)$$

$$s_j = \frac{1}{(m \times n - 1)} \sqrt{\sum_{l=L-1}^{L-m} \sum_{i=1}^{n} (x_{l,j,i} - \bar{x}_j)^2} \qquad (where\ i \in [1,31]\ and\ j \in [1,12]) \qquad (2)$$

$$C_j = \bar{x}_j + t_{m \times n - 1}\ s_j \qquad (where\ i \in [1,31]\ and\ j \in [1,12]) \qquad (3)$$

Equation (4), (5) and (6):

$$d_{L,j,i} = \frac{x_{L,j,i} - \bar{x}_j}{\bar{x}_j} \times 100 \qquad (L-year, j-month, i-day\,of\,month) \qquad (4)$$

$$w_{L,j,i} = \sum_{n=0}^{n=6} d_{L,j,i-n} \qquad (7-days\;cumulated\;\;deviation) \qquad (5)$$

$$v_{L,j,i} = d_{L,j,i} - d_{L,j,i-1} \qquad (change\,of\,the\,daily\;\;deviation) \qquad (6)$$

Equation (7), (8) and (9):

$$\mathrm{supp}(\alpha(k)) = \{d_{l<L,j,i} \,;\, F(d) \geq (1-\alpha)\} \tag{7}$$

$$\mathrm{supp}(\beta(k)) = \{w_{l<L,j,i} \,;\, F(w) \geq (1-\beta)\} \tag{8}$$

$$\mathrm{supp}(\delta(k)) = \{v_{l<L,j,i} \,;\, F(v) \geq (1-\delta)\} \tag{9}$$

Equation (10), (11), (12), (13), (14) and (15):

$$S_j(k+1) \Leftarrow \{S_i(k) \otimes R_{i,j} \otimes X_i(k), \; S_i(k) = k_w w_i(k)\} \qquad (10)$$

$$X_i(k) \Leftarrow B_{i,m}(\alpha(k), \beta(k), \delta(k)) \otimes \begin{bmatrix} d_{i,m}(k) \\ w_{i,m}(k) \\ v_{i,m}(k) \end{bmatrix} \qquad (11)$$

$$Y_i(k) \Leftarrow H_{i,n} \{(\gamma_0(k), \gamma_1(k), ..., \gamma_n(k)) \otimes \begin{bmatrix} S(k) \\ S(k-1) \\ ... \\ S(k-n) \end{bmatrix} \otimes G_i(k)\} \qquad (12)$$

where

$$X \subset \overset{z}{\underset{z=1}{Y}} \overline{supp}(z) \qquad (13)$$

$$supp(z) = supp(X_{z,1}) \times supp(X_{z,2}) \times supp(X_{z,3}) \qquad (14)$$

$$Y_i = (Q_{i,h}, T_{i,h}, P_{i,h}) \qquad (15)$$